Claims:

1. A solid multicomponent membrane for use in a reactor
characterised in that
the membrane comprises a mixed metal oxide having a structure represented by the formula:

$$La_{1-x}Ca_x(Fe_{1-y-y'}Ti_yAl_{y'})_wO_{3-d}$$

wherein x, y, y', w, and d each represent a number such that $0.1 \leq (y+y') \leq 0.8$, $0.15 \leq (x+y') \leq 0.95$, $0.05 \leq (x-y) \leq 0.3$, $0.95 < w < 1$, and d equals a number that renders the compound charge neutral and is not less than zero and not greater than about 0.8.

2. A membrane according to claim 1,
characterised in that
the x, y, y', w, and d each represent a number such that $0.15 < (y+y') < 0.75$, $0.2 < (x+y') < 0.9$, $0.05 < (x-y) < 0.15$, $0.95 < w < 1$, and d equals a number that renders the compound charge neutral and is not less than zero and not greater than about 0.8.

3. A membrane according to claim 1,
characterised in that
$0 < y < 0.75$ and $0 < y' < 0.3$.

4. Use of the membrane according to claims 1- 3, in a reactor for generating heat by oxidation of a carbon containing fuel to CO_2 and H_2O on the oxidation side of the membrane reactor.

5. Use of the membrane according to claims 1- 3, for generating synthesis gas consisting of one or more of the components CO, CO_2, H_2 and N_2 in a reactor where the reactor is capable of reacting a mixture of steam and a carbon containing fuel with oxygen permeated through said membrane to make synthesis gas.

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